Sheila Dalton
Manager, Nuclear Support Services
Oconee Nuclear Station

Duke Energy
ON01SC | 7800 Rochester Hwy
Seneca, SC 29672

o. 864.873.3657
f: 864.873.3401
sheila.dalton@duke-energy.com

RA-20-0176

June 9, 2020 10 CFR 50.73

Attn: Document Control Desk
U. S. Nuclear Regulatory Commission
11555 Rockville Pike
Rockville, MD 20852-2746

Duke Energy Carolinas, LLC
Oconee Nuclear Station Unit 3
Docket Number: 50-287
Renewed Operating Licenses: DPR-57

Subject: Licensee Event Report 287/2020-001, Revision 00 – Unit 3 Manual Reactor Trip Due to Reaching Feedwater Heater Level Limit in Operating Procedure

Licensee Event Report 287/2020-001, Revision 00, is being submitted pursuant to the requirements of 10 CFR 50.73 to provide notification of the subject event.

There are no regulatory commitments associated with this LER.

There are no unresolved corrective actions necessary to restore compliance with NRC requirements.

If there are questions, or further information is needed, contact Sam Adams, Regulatory Affairs, at (864) 873-3348.

Sincerely,

Sheila Dalton

Sheila Dalton
Manager, Nuclear Support Services
Oconee Nuclear Station

Enclosure

cc (w/Enclosure):

Ms. Laura Dudes, Administrator, Region II
U.S. Nuclear Regulatory Commission
Marquis One Tower
245 Peachtree Center Ave., NE, Suite 1200
Atlanta, GA 30303-1257

Mr. Shawn Williams, Project Manager
(by electronic mail only)
U.S. Nuclear Regulatory Commission
11555 Rockville Pike
Mail Stop O-08B1A
Rockville, MD 20852-2738

Mr. Jared Nadel
NRC Senior Resident Inspector
Oconee Nuclear Station

NRC FORM 366 (04-2020) | U.S. NUCLEAR REGULATORY COMMISSION

LICENSEE EVENT REPORT (LER)

(See Page 2 for required number of digits/characters for each block)

(See NUREG-1022, R.3 for instruction and guidance for completing this form http://www.nrc.gov/reading-rm/doc-collections/nuregs/staff/sr1022/r3/)

APPROVED BY OMB: NO. 3150-0104 **EXPIRES: 04/30/2020**

1. Facility Name	2. Docket Number	3. Page
Oconee Nuclear Station Unit 3	05000287	1 OF 3

4. Title

Unit 3 Manual Reactor Trip Due to Reaching Feedwater Heater Level Limit in Operating Procedure

5. Event Date			6. LER Number			7. Report Date			8. Other Facilities Involved	
Month	Day	Year	Year	Sequential Number	Rev No.	Month	Day	Year	Facility Name	Docket Number
									NA	05000
04	10	2020	2020	001	0	06	09	2020	Facility Name	Docket Number
									NA	05000

9. Operating Mode	11. This Report is Submitted Pursuant to the Requirements of 10 CFR §: *(Check all that apply)*			
1	☐ 20.2201(b)	☐ 20.2203(a)(3)(i)	☐ 50.73(a)(2)(ii)(A)	☐ 50.73(a)(2)(viii)(A)
	☐ 20.2201(d)	☐ 20.2203(a)(3)(ii)	☐ 50.73(a)(2)(ii)(B)	☐ 50.73(a)(2)(viii)(B)
	☐ 20.2203(a)(1)	☐ 20.2203(a)(4)	☐ 50.73(a)(2)(iii)	☐ 50.73(a)(2)(ix)(A)
	☐ 20.2203(a)(2)(i)	☐ 50.36(c)(1)(i)(A)	☒ 50.73(a)(2)(iv)(A)	☐ 50.73(a)(2)(x)
10. Power Level	☐ 20.2203(a)(2)(ii)	☐ 50.36(c)(1)(ii)(A)	☐ 50.73(a)(2)(v)(A)	☐ 73.71(a)(4)
032	☐ 20.2203(a)(2)(iii)	☐ 50.36(c)(2)	☐ 50.73(a)(2)(v)(B)	☐ 73.71(a)(5)
	☐ 20.2203(a)(2)(iv)	☐ 50.46(a)(3)(ii)	☐ 50.73(a)(2)(v)(C)	☐ 73.77(a)(1)
	☐ 20.2203(a)(2)(v)	☐ 50.73(a)(2)(i)(A)	☐ 50.73(a)(2)(v)(D)	☐ 73.77(a)(2)(ii)
	☐ 20.2203(a)(2)(vi)	☐ 50.73(a)(2)(i)(B)	☐ 50.73(a)(2)(vii)	☐ 73.77(a)(2)(iii)
		☐ 50.73(a)(2)(i)(C)	☐ Other (Specify in Abstract below or in NRC Form 366A	

12. Licensee Contact for this LER

Licensee Contact	Telephone Number (Include Area Code)
Sam Adams, Oconee Regulatory Affairs	(864) 873-3348

13. Complete One Line for each Component Failure Described in this Report

Cause	System	Component	Manufacturer	Reportable To ICES	Cause	System	Component	Manufacturer	Reportable To ICES
N/A					N/A				

14. Supplemental Report Expected	15. Expected Submission Date	Month	Day	Year
☐ Yes (If yes, complete 15. Expected Submission Date) X No				

Abstract (Limit to 1400 spaces, i.e., approximately 14 single-spaced typewritten lines)

On April 10, 2020 at 2125 EDT, Oconee Unit 3 was manually tripped from 32% power based on the water level in the 3F1 Feedwater Heater. At the time of the trip, Unit 3 was reducing power as part of a planned shutdown for a refueling outage. The trip was initiated in accordance with procedural guidance that called for tripping the Reactor and Main Turbine if a large Feedwater tube leak exists and any 'F' Feedwater Heater Level indicates >/= 14" while the Reactor is greater than 25% power. At the time of the trip it was thought that there had been a significant tube leak in the 3F1 Feedwater Heater. Subsequent investigation determined there was no tube leak associated with the increased level in the 3F1 heater.

Post-trip plant response was normal and plant conditions were controlled and maintained within the allowances of Technical Specifications with no safety system actuations.

An ongoing cause analysis has determined that the unit trip was due to an overly restrictive heater level limit placed in the operating procedure that did not account for the various heater levels that occur during power reductions.

This event was reported as a 4-hour notification to the NRC on April 11, 2020, in Event Notification (EN) number 54661 under 10 CFR 50.72(b)(2)(iv)(B) - Reactor Protection System (RPS) Actuation – Critical (Manual Reactor Trip). The event is also reportable under 10 CFR 50.73(a)(2)(iv)(A) as an actuation of the RPS.

LICENSEE EVENT REPORT (LER)
CONTINUATION SHEET

(See NUREG-1022, R.3 for instruction and guidance for completing this form http://www.nrc.gov/reading-rm/doc-collections/nuregs/staff/sr1022/r3/)

1. FACILITY NAME	2. DOCKET NUMBER	3. LER NUMBER		
		YEAR	SEQUENTIAL NUMBER	REV NO.
Oconee Nuclear Station Unit 3	05000287	2020	001	0

NARRATIVE

EVALUATION:

BACKGROUND

Oconee is equipped with six (6) stages (A, B, C, D, E, and F) of Feedwater heaters [EIIS: HX]. The 'F' stage is the lowest pressure and these heaters are in the neck of each condenser directly under each low-pressure turbine. All the Oconee Feedwater Heaters are shell and tube design with Condensate/Feedwater in the tubes and Extraction Steam and Heater Drains on the shell side. The 'F' heaters receive steam from the 12th stage of each low-pressure turbine and drain directly to each condenser. The steam is condensed by the heat transfer across the tube bundle and condensate forms in each heater. This condensate is routed to the Condensate/Feedwater system [EIIS: SD/SJ].

Most Feedwater Heaters are equipped with check valves in the extraction steam lines that will prevent liquid from backing up and entering the Turbine. These Extraction Check Valves are installed in all extraction lines except the 'F' stage extractions at Oconee. For this reason, level monitoring and control is a critical parameter for the 'F' Feedwater Heaters.

When the manual reactor trip was initiated, Oconee Nuclear Station (ONS) Unit 3 was reducing power for a planned, normal shutdown with power at 32%. ONS Units 1 and 2 were operating in MODE 1 at 100% power. No significant structures, systems or components were out of service such that they contributed to this event.

This event was reported as a 4-hour notification to the NRC on April 11, 2020, in Event Notification (EN) number 54661 under 10 CFR 50.72(b)(2)(iv)(B) - Reactor Protection System (RPS) Actuation – Critical (Manual Reactor Trip). The event is also reportable under 10 CFR 50.73(a)(2)(iv)(A) as an actuation of the RPS.

EVENT DESCRIPTION

On April 10, 2020 at 2125 EDT, Oconee Unit 3 was manually tripped from 32% power based on the water level in the 3F1 Feedwater Heater. At the time of the trip, Unit 3 was reducing power as part of a planned shutdown for a refueling outage. The trip was performed in accordance with procedural guidance that called for tripping the Reactor and Main Turbine if a large Feedwater tube leak exists and any 'F' Feedwater Heater Level indicates >/= 14" while the Reactor is greater than 25% power. At the time of the trip, it was thought there had been a significant tube leak in the 3F1 Feedwater Heater. Subsequent investigation determined there was no tube leak associated with the increased level in the 3F1 Feedwater Heater. The Reactor Trip was uncomplicated. Post-trip plant response was normal and plant conditions were controlled and maintained within the allowances of Technical Specifications with no safety system actuations.

LICENSEE EVENT REPORT (LER)
CONTINUATION SHEET

(See NUREG-1022, R.3 for instruction and guidance for completing this form http://www.nrc.gov/reading-rm/doc-collections/nuregs/staff/sr1022/r3/)

1. FACILITY NAME	2. DOCKET NUMBER	3. LER NUMBER		
		YEAR	SEQUENTIAL NUMBER	REV NO.
Oconee Nuclear Station Unit 3	05000287	2020	001	0

NARRATIVE

CAUSAL FACTORS

An ongoing Root Cause Evaluation (RCE) has determined that the unit trip was due to an overly restrictive heater level limit placed in the operating procedure that did not account for the various heater levels that occur during power reductions.

CORRECTIVE ACTIONS

Immediate:

1. Performed a pressure test on each 3F1 heater tube and determined no thru-wall leak existed.
2. Calibrated the level control valve and level transmitter for 3F1 heater with no issues identified.
3. Performed visual inspection of piping downstream of 3F1 heater's level control valve verifying no flow restrictions.
4. Revised the applicable Unit 3 operating procedure to correct the procedural guidance for tripping the reactor at the appropriate 'F' heater level.

Planned:

1. Revise the applicable operating procedures for Units 1 and 2 consistent with changes made to the Unit 3 procedure.
2. Complete the on-going RCE and implement corrective actions identified therein.

SAFETY ANALYSIS

The Unit 3 manual trip on April 10, 2020 was uncomplicated and had no impact on public health and safety. The 3F1 Feedwater Heater level and the manual trip from 32% power did not affect the post-trip response of the plant. Feedwater flow to the steam generators was maintained throughout the event and no equipment problems were experienced that required unusual operator actions. No Emergency Core Cooling System (ECCS) or other safety system actuations occurred in response to this event, and no issues were identified with operator response or procedures. Thus, it is concluded that the impact of this event on overall plant risk is insignificant and had no impact on public health and safety.

ADDITIONAL INFORMATION

A review of Duke Energy's Corrective Action Program did not identify any Oconee LERs or events in the last 3 years that involved the same underlying concerns or reasons as this event.

Energy Industry Identification System (EIIS) codes are identified in the text as [XX]. This event is considered INPO Consolidated Events System (ICES) Reportable. There were no releases of radioactive materials, radiation exposures or personnel injuries associated with this event.